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RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/843,250

DATE: 03/04/2002

TIME: 15:02:39

Input Set : A:\09-843250 Sequence Listing.txt

Output Set: N:\CRF3\03042002\I843250.raw

4 <110> APPLICANT: Parales, R.
 5 Gibson, D.
 6 Resnick, S.
 7 Lee, K.
 9 <120> TITLE OF INVENTION: Novel naphthalene dioxygenase and methods for their use
 11 <130> FILE REFERENCE: 875.006US2
 13 <140> CURRENT APPLICATION NUMBER: US 09/843,250
 14 <141> CURRENT FILING DATE: 2001-04-26
 16 <150> PRIOR APPLICATION NUMBER: PCT/US99/25079
 17 <151> PRIOR FILING DATE: 1999-10-26
 19 <150> PRIOR APPLICATION NUMBER: US 60/105,575
 20 <151> PRIOR FILING DATE: 1998-10-26
 22 <160> NUMBER OF SEQ ID NOS: 65
 24 <170> SOFTWARE: FastSEQ for Windows Version 4.0
 26 <210> SEQ ID NO: 1
 27 <211> LENGTH: 2265
 28 <212> TYPE: DNA
 29 <213> ORGANISM: Artificial Sequence
 31 <220> FEATURE:
 32 <223> OTHER INFORMATION: A sequence encoding an NDO mutant.
 34 <400> SEQUENCE: 1

| | | | | | | | |
|----|-------------|-------------|-------------|-------------|------------|------------|------|
| 35 | gagggtagag | aaatcgaatg | ccccttgcat | caaggtcgg | ttgacgtttg | cacaggcaaa | 60 |
| 36 | gccctgtg | cacccgtgac | acagaacatc | aaaacatc | cagtcaagat | tgagaacctg | 120 |
| 37 | cgcgtaata | ttgatttgag | ctaagaattt | taacaggagg | caccccgggc | cctagagcgt | 180 |
| 38 | aatcaccccc | attccatctt | tttttaggtg | aaacatgaat | tacaataata | aaatcttggt | 240 |
| 39 | aagtgaatct | ggtctgagcc | aaaagcacct | gattcatggc | gatgaagaac | ttttccaaca | 300 |
| 40 | tgaactgaaa | accatttttg | cgcggaactg | gctttttctc | actcatgata | gcctgattcc | 360 |
| 41 | tgcccccg | gactatgtta | ccgcaaaaat | ggggattgac | gaggtcatcg | tctcccggca | 420 |
| 42 | gaacgacggt | tcgattcgtg | cttttctgaa | cgtttgccgg | catcgtggca | agacgctggt | 480 |
| 43 | gagcgtggaa | gccggcaatg | ccaaagggtt | tgtttgcagc | tatcacggct | ggggcttcgg | 540 |
| 44 | ctccaacggt | gaactgcaga | gcgttccatt | tgaaaaagat | ctgtacggcg | agtcgctcaa | 600 |
| 45 | taaaaaatgt | ctgggggttg | aagaagtcgc | tcgcgtggag | agcttccatg | gcttcatcta | 660 |
| 46 | cggttgcttc | gaccaggagg | cccctcctct | tatggactat | ctgggtgacg | ctgcttggtg | 720 |
| 47 | cctggaacct | atgttcaagc | attccggcgg | tttagaaactg | gtcggtcctc | caggcaaggt | 780 |
| 48 | tgtgatcaag | gccaactgga | aggcacccgc | ggaaaacttt | gtgggagatg | cataccacgt | 840 |
| 49 | gggttgagc | cacgcgtctt | cgcttcgctc | gggggagtct | atcttctcgt | cgctcgctgg | 900 |
| 50 | caatgcggcg | ctaccacctg | aaggcgcagg | cttgcaaatg | acctccaaat | acggcagcgg | 960 |
| 51 | catgggtgtg | ttgtgggacg | gatattcagg | tgtgcatagc | gcagacttgg | ttccggaatt | 1020 |
| 52 | gatggcattc | ggaggcgcaa | agcaggaaaag | gctgaacaaa | gaaattggcg | atgttcgcgc | 1080 |
| 53 | tcgggatttat | cgcagccacc | tcaactgcac | cgttttcccg | aacaacagca | tgctgacctg | 1140 |
| 54 | ctcgggtgtt | ttcaaaagtat | ggaaccgcgat | cgacgcaaac | accaccgagg | tctggacctg | 1200 |
| 55 | cgccattgtc | gaaaaagaca | tgcttgagga | tctcaagcgc | cgcttgcccg | actctgttca | 1260 |
| 56 | gcgaacggtc | gggcctgctg | gcttctggga | aagcgcgcgc | aatgacaata | tggaacagc | 1320 |

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57 ttcgcaaaac ggcaagaaat atcaatcaag agatagtgat ctgctttcaa accttggttt 1380
58 cggtgaggac gtatacggcg acgcggtcta tccaggcgtc gtcggcaaat cggcgatcgg 1440
59 cgagaccagt tatcgtggtt tctaccgggc ttaccaggca cacgtcagca gctccaactg 1500
60 ggctgagttc gagcatgcct ctagtacttg gcatactgaa cttacgaaga ctactgatcg 1560
61 ctaacagacg agtcgaccat gatgatcaat attcaagaag acaagctggt ttccgcccac 1620
62 gacgccgaag agattcttcg tttcttcaat tgccacgact ctgctttgca acaagaagcc 1680
63 actacgctgc tgaccaggga agcgcatitt ttggacattc aggcttaccg tgcttggtta 1740
64 gagcactgcg tggggtcaga ggtgcaatat caggtcattt cacgcgaact gcgcgcagct 1800
65 tcagagcgtc gttataagct caatgaagcc atgaacgttt acaacgaaaa ttttcagcaa 1860
66 ctgaaagtgc gaggttgagca tcaactggat ccgcaaaact ggggcaacag cccgaagctg 1920
67 cgctttactc gctttatcac caacgtccag gccgcaatgg acgtaaatga caaagagcta 1980
68 cttcacatcc gctccaacgt cattctgcac cgggcacgac gtggcaatca ggtcgatgct 2040
69 ttctacgccg cccgggaaga taaatggaaa cgtggcgaag gtggagtacg aaaattggct 2100
70 cagcgattcg tcgattaccc agagcgcata cttcagacgc acaatctgat ggtctttctg 2160
71 tgattcagtg accattttta caaatggtca ctgcaaccgc ggtcaccatt aatcaaaggg 2220
72 aatgtacgtg tatgggcaat caacaagtcg tttcgataac cggtg 2265

```

74 <210> SEQ ID NO: 2

75 <211> LENGTH: 449

76 <212> TYPE: PRT

77 <213> ORGANISM: Artificial Sequence

79 <220> FEATURE:

80 <223> OTHER INFORMATION: A polypeptide encoded by SEQ ID NO:1

82 <400> SEQUENCE: 2

```

83 Met Asn Tyr Asn Asn Lys Ile Leu Val Ser Glu Ser Gly Leu Ser Gln
84 1 5 10 15
85 Lys His Leu Ile His Gly Asp Glu Glu Leu Phe Gln His Glu Leu Lys
86 20 25 30
87 Thr Ile Phe Ala Arg Asn Trp Leu Phe Leu Thr His Asp Ser Leu Ile
88 35 40 45
89 Pro Ala Pro Gly Asp Tyr Val Thr Ala Lys Met Gly Ile Asp Glu Val
90 50 55 60
91 Ile Val Ser Arg Gln Asn Asp Gly Ser Ile Arg Ala Phe Leu Asn Val
92 65 70 75 80
93 Cys Arg His Arg Gly Lys Thr Leu Val Ser Val Glu Ala Gly Asn Ala
94 85 90 95
95 Lys Gly Phe Val Cys Ser Tyr His Gly Trp Gly Phe Gly Ser Asn Gly
96 100 105 110
97 Glu Leu Gln Ser Val Pro Phe Glu Lys Asp Leu Tyr Gly Glu Ser Leu
98 115 120 125
99 Asn Lys Lys Cys Leu Gly Leu Lys Glu Val Ala Arg Val Glu Ser Phe
100 130 135 140
101 His Gly Phe Ile Tyr Gly Cys Phe Asp Gln Glu Ala Pro Pro Leu Met
102 145 150 155 160
103 Asp Tyr Leu Gly Asp Ala Ala Trp Tyr Leu Glu Pro Met Phe Lys His
104 165 170 175
105 Ser Gly Gly Leu Glu Leu Val Gly Pro Pro Gly Lys Val Val Ile Lys
106 180 185 190
107 Ala Asn Trp Lys Ala Pro Ala Glu Asn Phe Val Gly Asp Ala Tyr His
108 195 200 205

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```

109 Val Gly Trp Thr His Ala Ser Ser Leu Arg Ser Gly Glu Ser Ile Phe
110      210                      215                      220
111 Ser Ser Leu Ala Gly Asn Ala Ala Leu Pro Pro Glu Gly Ala Gly Leu
112 225                      230                      235                      240
113 Gln Met Thr Ser Lys Tyr Gly Ser Gly Met Gly Val Leu Trp Asp Gly
114                      245                      250                      255
115 Tyr Ser Gly Val His Ser Ala Asp Leu Val Pro Glu Leu Met Ala Phe
116                      260                      265                      270
117 Gly Gly Ala Lys Gln Glu Arg Leu Asn Lys Glu Ile Gly Asp Val Arg
118                      275                      280                      285
119 Ala Arg Ile Tyr Arg Ser His Leu Asn Cys Thr Val Phe Pro Asn Asn
120                      290                      295                      300
121 Ser Met Leu Thr Cys Ser Gly Val Phe Lys Val Trp Asn Pro Ile Asp
122 305                      310                      315                      320
123 Ala Asn Thr Thr Glu Val Trp Thr Tyr Ala Ile Val Glu Lys Asp Met
124                      325                      330                      335
125 Pro Glu Asp Leu Lys Arg Arg Leu Ala Asp Ser Val Gln Arg Thr Val
126                      340                      345                      350
127 Gly Pro Ala Gly Phe Trp Glu Ser Asp Asp Asn Asp Asn Met Glu Thr
128                      355                      360                      365
129 Ala Ser Gln Asn Gly Lys Lys Tyr Gln Ser Arg Asp Ser Asp Leu Leu
130                      370                      375                      380
131 Ser Asn Leu Gly Phe Gly Glu Asp Val Tyr Gly Asp Ala Val Tyr Pro
132 385                      390                      395                      400
133 Gly Val Val Gly Lys Ser Ala Ile Gly Glu Thr Ser Tyr Arg Gly Phe
134                      405                      410                      415
135 Tyr Arg Ala Tyr Gln Ala His Val Ser Ser Asn Trp Ala Glu Phe
136                      420                      425                      430
137 Glu His Ala Ser Ser Thr Trp His Thr Glu Leu Thr Lys Thr Thr Asp
138                      435                      440                      445
139 Arg

```

142 <210> SEQ ID NO: 3

143 <211> LENGTH: 9841

144 <212> TYPE: DNA

145 <213> ORGANISM: Artificial Sequence

147 <220> FEATURE:

148 <223> OTHER INFORMATION: A modified DNA molecule encoding valine at the
 149 position corresponding to the F352 amino acid in

150 NDO.

152 <400> SEQUENCE: 3

```

153 gaattcatca ggaagacatt caaatgaacg taaacaataa gggcagcgtc tgtatttgcg      60
154 gcagcgaaat gctccctaaa ttcctcattt accccatctg aggattgctt tatgacagta      120
155 aagtggattg aagcagtcgc tctttctgac atccttgaag gtgacgtcct cggcgtgact      180
156 gtcgagggca aggagctggc gctgtatgaa gttgaaggcg aaatctacgc taccgacaac      240
157 ctgtgcacgc atgggtccgc ccgcatgagt gatggttatc tcgagggtag agaaatcgaa      300
158 tgcccccttg atcaaggtcg gtttgacggt tgcaacaggca aagccctgtg cgcacccgtg      360
159 acacagaaca tcaaaacata tccagtcaag attgagaacc tgcgcgtaat gattgatttg      420
160 agctaagaat tttaacagga ggcaccccg ggcctagagc gtaatcaccc ccattccatc      480
161 ttttttaggt gaaaacatga attacaataa taaaatcttg gtaagtgaat ctgggtctgag      540

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| | | | | | | | |
|-----|-------------|-------------|-------------|------------|------------|-------------|------|
| 162 | ccaaaagcac | ctgattcatg | gcgatgaaga | acttttccaa | catgaactga | aaaccatttt | 600 |
| 163 | tgcgcggaac | tggctttttc | tcactcatga | tagcctgatt | cctgcccccg | gcgactatgt | 660 |
| 164 | taccgcaaaa | atgggggattg | acgaggtcat | cgtctcccg | cagaacgacg | gttcgattcg | 720 |
| 165 | tgcttttctg | aacgttttgcc | ggcatcgtgg | caagacgctg | gtgagcgtgg | aagccggcaa | 780 |
| 166 | tgccaaaggt | tttgtttgca | gctatcacgg | ctggggcttc | ggctccaacg | gtgaactgca | 840 |
| 167 | gagcgttcca | tttgaaaaag | atctgtacgg | cgagtcgctc | aataaaaaat | gtctgggggtt | 900 |
| 168 | gaaagaagtc | gctcgcggtg | agagcttcca | tggcttcate | tacggttgct | tcgaccagga | 960 |
| 169 | ggccctcct | cttatggact | atctgggtga | cgctgcttgg | tacctggaac | ctatgttcaa | 1020 |
| 170 | gcattccggc | ggtttagaac | tggtcggtcc | tccaggcaag | gttgtgatca | aggccaactg | 1080 |
| 171 | gaaggcacc | gcggaaaact | ttgtgggaga | tgcataccac | gtgggttga | cgcacgctc | 1140 |
| 172 | ttcgcttcgc | tcgggggagt | ctatcttctc | gtcgctcgct | ggcaatgcg | cgctaccacc | 1200 |
| 173 | tgaaggcgca | ggcttgcaaa | tgacctccaa | atacggcagc | ggcatgggtg | tgttgtggga | 1260 |
| 174 | cggatattca | ggtgtgcata | gcgcagactt | ggttccggaa | ttgatggcat | tcggaggcgc | 1320 |
| 175 | aaagcaggaa | aggctgaaca | aagaaattgg | cgatgttcgc | gctcggattt | atcgagcca | 1380 |
| 176 | cctcaactgc | accgttttcc | cgaacaacag | catgctgacc | tgctcgggtg | ttttcaaagt | 1440 |
| 177 | atggaaccgc | atcgacgcaa | acaccaccga | ggtctggacc | tacgccattg | tcgaaaaaga | 1500 |
| 178 | catgcctgag | gatctcaagc | gccgcttggc | cgactctgtt | cagcgaacgg | tcgggcctgc | 1560 |
| 179 | tggcttctgg | gaaagcgacg | acaatgacaa | tatggaaaca | gcttcgcaaa | acggcaagaa | 1620 |
| 180 | atatcaatca | agagatagtg | atctgctttc | aaaccttgg | ttcggtgagg | acgtatacgg | 1680 |
| 181 | cgacgcggtc | tatccaggcg | tcgtcggcaa | atcggcgatc | ggcgagacca | gttatcgtgg | 1740 |
| 182 | tttctaccgg | gcttaccagg | cacacgtcag | cagctccaac | tgggctgagt | tcgagcatgc | 1800 |
| 183 | ctctagtaact | tggcatactg | aacttacgaa | gactactgat | cgctaacaga | cgagtcgacc | 1860 |
| 184 | atgatgatca | atattcaaga | agacaagctg | gtttccgccc | acgacgccga | agagattctt | 1920 |
| 185 | cgtttcttca | attgccacga | ctctgctttg | caacaagaag | ccactacgct | gctgaccag | 1980 |
| 186 | gaagcgcat | tgttggacat | tcaggcttac | cgtgcttgg | tagagcactg | cgtgggggtca | 2040 |
| 187 | gaggtgcaat | atcagggtcat | ttcacgcgaa | ctgcgcgcag | cttcagagcg | tcgttataag | 2100 |
| 188 | ctcaatgaag | ccatgaacgt | ttacaacgaa | aattttcagc | aactgaaaag | tcgagttgag | 2160 |
| 189 | catcaactgg | atccgcaaaa | ctggggcaac | agcccgaagc | tgcgctttac | tcgctttatc | 2220 |
| 190 | accaacgtcc | aggccgcaat | ggacgtaaat | gacaaaagc | tacttcacat | ccgctccaac | 2280 |
| 191 | gtcattctgc | accgggcacg | acgtggcaat | caggtcgatg | tcttctacgc | cgcccgggaa | 2340 |
| 192 | gataaatgga | aacgtggcga | agggtggagta | cgaaaattgg | tccagcgatt | cgctcgattac | 2400 |
| 193 | ccagagcgca | tacttcagac | gcacaatctg | atggctcttc | tgtgattcag | tgaccatttt | 2460 |
| 194 | tacaaatggt | cactgcaacc | gcggtcacca | ttaatcaaag | ggaatgtacg | tgtatgggca | 2520 |
| 195 | atcaacaagt | cgtttcgata | accggtgcag | gctcaggaat | cggtctcgaa | ctggttcggt | 2580 |
| 196 | cctttaagtc | ggccggttat | tacgtatccg | ctctcgtacg | aaacgaggag | caagaggcgc | 2640 |
| 197 | ttctttgcaa | agagttcaag | gacgcactcg | agattgtagt | gggcgatgtc | cgggaccacg | 2700 |
| 198 | caacaaatga | gaagctgata | aagcaaaaca | tcgatagatt | cggtcatctt | gattgtttta | 2760 |
| 199 | ttgcaaatgc | cggtatctgg | gattacatgc | tgagcatcga | agagccttgg | gagaaaaatat | 2820 |
| 200 | cgagcagttt | tgacgaaaata | ttcgacatta | atgtcaagag | ctatttcagt | ggcatcagtg | 2880 |
| 201 | ccgccctgcc | ggaactgaaa | aagactaacg | gatcagtggt | gatgaccgct | tcggtgtcgt | 2940 |
| 202 | cccatgcggt | cgggtggtgt | ggttcttctg | acatcgccag | caagcatgcg | gtgctcggtta | 3000 |
| 203 | tggttaaggc | tttggcctac | gaattggccc | ccgaagtctg | cgtgaacgct | gtttcgccgg | 3060 |
| 204 | ggggcaccgt | gacgtctctg | tgcggtcccg | cgagcgccgg | tttcgacaaa | atgcacatga | 3120 |
| 205 | aagacatgcc | cggcatcgac | gatatgatca | aaggtctcac | gcctcttggg | tttgagcca | 3180 |
| 206 | agcccgaaga | cgtggtggca | ccctatttgt | tgctggcttc | gcgaaagcaa | ggaaaattca | 3240 |
| 207 | tcaccggcac | cgtgattagc | attgatggcg | gtatggcgct | cggtcgcaag | tgagcttgta | 3300 |
| 208 | gccgatcaga | agttatagac | acatttcagg | tgacgcccga | tgaagacaaa | actgtttatc | 3360 |
| 209 | aataacgcct | ggatcgattc | tagtgaccag | cagaccttcg | agcgataca | ccccgtcagc | 3420 |
| 210 | agcgatgtgg | tgactgagag | cgcaaacgcc | acagtgacgg | acgcgataaa | ggcggcgcaa | 3480 |

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| | | | | | | | |
|-----|-------------|-------------|-------------|-------------|-------------|------------|------|
| 211 | gcgggccgagg | agggcgttcaa | gacctggaag | gccgttggac | cttcagagcg | tcgccgcctt | 3540 |
| 212 | ctcctaaaagg | tcgccgatgt | catggaaaagt | aaaacaccca | agttcatcga | agtgatggcc | 3600 |
| 213 | atggagggtgg | gagcttccgc | cctttggggcc | ggattcaacg | tccatgcgtc | tgccaatgtg | 3660 |
| 214 | ttccgagagg | ctgcctcgtc | ggctacccaa | attcaggggtg | aaaccatccc | aacggacaaa | 3720 |
| 215 | gccgaaacgc | tctcaatgac | actacgtcag | ccggtcggcc | cgatcctaag | catcgttcca | 3780 |
| 216 | tggaaacggca | ccgcagtgtc | tgcggcacga | gccatcgctt | atccgctggt | ctgtggcaac | 3840 |
| 217 | actgtggtgt | tcaaaggctc | tgaatttagt | cccgcgacgc | atgccctgat | caccagtg | 3900 |
| 218 | gtgcagggaag | ccgggctgcc | cgctggcggtg | ctcaattacc | tcaactcttc | gcctgaccgt | 3960 |
| 219 | tcgcccagaga | tcgtgacgc | actgatctct | gccaaaggaga | tccgcccgc | caacttcacg | 4020 |
| 220 | ggttccacccc | gcgtgggcag | cattatcgcg | cagaaaagccg | cgcaaacacct | caagcgctgc | 4080 |
| 221 | ctgctgggagc | tcggcgccaa | gtccccgctt | attgttctgg | atgatgcaga | catcgatgcg | 4140 |
| 222 | gcggtcaagg | cagcgggtgtt | cggtagcttc | ctgttccaa | gtcagatctg | catgtccact | 4200 |
| 223 | gagcgttga | tcgttgatga | gaagatagcc | gacgaatttg | tcgcaaaatt | tgtcgaaaaa | 4260 |
| 224 | actaagcgct | tgagcgcagg | cgacccgtgc | gtaactggcg | actgcatcat | cggcccgatg | 4320 |
| 225 | gtctcgccaa | attcgggtga | gcggatcaat | ggtttgttca | aagacgcgat | cgacaaaagg | 4380 |
| 226 | gcaaaagtgt | tttgcgggcg | cttggcccaa | ggtgcgctca | tgccggccac | gatcctggat | 4440 |
| 227 | cacgtcaaat | ctgacatgcg | gatttacgat | gaggagacct | ttggtcccat | caccgtggta | 4500 |
| 228 | atccgttgtga | aaggcgaagc | agaggccgtc | cgcattgcca | acgacagcgt | ctatggcctg | 4560 |
| 229 | tcgtcgggcg | tatttgggccg | cgacatcaac | cgcgctctac | gcgtgggtat | gtccatcgaa | 4620 |
| 230 | tatggttctg | tacacatcaa | cggttcgacc | gtccagaacg | aggcgcaggc | tccttacgga | 4680 |
| 231 | ggcaccaaga | acaccggcta | cgggcgcttc | gacggccgtg | ctgtaatcga | cgagttcaca | 4740 |
| 232 | gagatcaagt | ggctgaccat | cgaacctttc | gagcagcaat | atcccttctg | ataagcacta | 4800 |
| 233 | actcccagga | atcaaaactat | gagtaagcaa | gctgcagtta | tcgagctcgg | atacatgggt | 4860 |
| 234 | atctcggtca | aggaccctga | tgcgtggaaa | tcatattgcca | cggatatgct | aggtctgcaa | 4920 |
| 235 | gttcttgatg | aggggtgagaa | ggaccgtttc | tatctgcgga | tggattactg | gcatcatcgg | 4980 |
| 236 | atcgtagtcc | atcacaacgg | acaggacgac | ttggagtacc | taggctggcg | tgtagccggc | 5040 |
| 237 | aagccggagt | tcgaagctct | gggtcaaaa | cttattgatg | ccggttacia | gatccgcata | 5100 |
| 238 | tgcgacaaa | ttgaggctca | ggagcgtatg | gtgttggttc | tgatgaagac | agaagatccg | 5160 |
| 239 | ggcggcaacc | cgaccgagat | attctggggc | ccccggatcg | acatgagcaa | cccgttccat | 5220 |
| 240 | cccggctcgcc | ccctgcacgg | aaagtgtgtg | accggtgacc | aaggcttggg | ccattgcata | 5280 |
| 241 | gttcgccaaa | ccgacgtcgc | agaagctcat | aagttttata | gcctgctggg | cttccgtggg | 5340 |
| 242 | gacgtcgaat | accggattcc | gttgcccaac | ggcatgactg | ccgaactgtc | gttcatgcat | 5400 |
| 243 | tgcaacgccc | gtgatcactc | cattgctttt | ggtgccatgc | ccgctgccaa | acgactcaat | 5460 |
| 244 | cacttgatgc | ttgagtacac | ccatatggaa | gacttgggat | acacgcacca | acagtttgta | 5520 |
| 245 | aagaacgaaa | ttgacattgc | cttgcagctt | ggcattcacg | ccaacgacaa | ggcgttgacg | 5580 |
| 246 | ttctatggtg | caacgccttc | gggctggctc | attgagcccg | gctggcgagg | tgccacggcc | 5640 |
| 247 | atagatgaag | cggagtatta | cgtcggcgac | atcttcggcc | atggcgtgga | ggccactgga | 5700 |
| 248 | tatggcctgg | atgtaaaaact | gagctaaaaga | tgcgcgctcg | ttgggcgagg | ctctagtcca | 5760 |
| 249 | gcatcttcat | acgcaaccaa | ccttgcaggg | cgatgagatc | aaaggacgtt | aaagcgaagg | 5820 |
| 250 | ggaagtgggt | cgggccatgc | gcataccgat | ccatgacatt | tgtttcatag | tatataggta | 5880 |
| 251 | gataggtgaa | tcaagcgctt | agtcaactag | tggacacatc | tgttccatga | ggctatctac | 5940 |
| 252 | tatctattca | aaacaagaat | aataaataag | atgaaaaata | taatgataaa | aagaacgatt | 6000 |
| 253 | tgtcttgtgt | atcctctatt | ctgtttggca | agccccacat | gggccgaaga | gtcgccttgg | 6060 |
| 254 | acgtaccgta | ttggtatgac | taatgtagct | ttcgatgcta | gcgcaaaagt | atacttaaat | 6120 |
| 255 | ggtcagcggg | tgccaggagg | aagcgtgtat | gcgagcgata | acaacgcgct | tacattcgac | 6180 |
| 256 | ttcggctacg | ccatcaacga | ccagtgggaat | gtacgtgcga | ttgtcggtat | tccgcctaca | 6240 |
| 257 | actaaaagtga | cgggcgcagg | cacacttcct | ggatccagc | tggggaaaaat | aacttacgct | 6300 |
| 258 | ccaacagtat | taacgttgaa | ctataaacctc | cccgccttgg | gtcccgttcg | ccctcacata | 6360 |
| 259 | ggtgcggggag | tcaattacac | gcggattttt | gaaagtcggg | acgctaatact | aaaatcgttc | 6420 |

Use of n and / or Xaa has been detected in the Sequence Listing. Review the Sequence Listing to ensure a corresponding explanation is present in the <220> to <223> fields of each sequence using n or Xaa.

VERIFICATION SUMMARY

DATE: 03/04/2002

PATENT APPLICATION: US/09/843,250

TIME: 15:02:40

Input Set : A:\09-843250 Sequence Listing.txt

Output Set: N:\CRF3\03042002\I843250.raw

L:569 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6

L:2069 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19